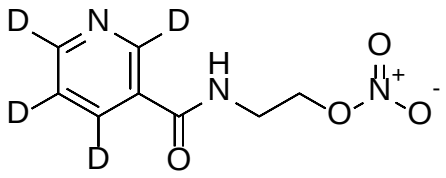
Product data sheet

MedKoo Cat#: 464709 Name: Nicorandil-d4 CAS: 1132681-23-2 Chemical Formula: $C_8H_5D_4N_3O_4$ Exact Mass: 215.0844 Molecular Weight: 215.2014	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:

Nicorandil-d4 is intended for use as an internal standard for the quantification of nicorandil by GC- or LC-MS. Nicorandil is an activator of sulfonylurea receptor 2B (SUR2B) linked to ATP-sensitive potassium channel Kir6.2 (EC50 = ~10 µM) and a nitric oxide (NO) donor. It is selective for SUR2B/Kir6.2 over the SUR2A/Kir6.2 channel (EC50 = >500 µM). Nicorandil activates soluble guanylate cyclase in a cell-free assay and relaxes partially depolarized isolated bovine coronary artery strips (EC50 = 4.4 µM). It decreases mean blood pressure, coronary resistance, and heart rate, as well as increases coronary sinus outflow, in dogs when administered intravenously at a dose of 1 mg/kg. Nicorandil increases survival and decreases infarct size in a rabbit model of myocardial ischemia-reperfusion injury induced by left coronary artery occlusion. Formulations containing nicorandil have been used in the treatment of angina pectoris.

2. CoA, QC data, SDS, and handling instruction

SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under “QC And Documents” section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
TBD	TBD	TBD

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	4.65 mL	23.23 mL	46.47 mL
5 mM	0.93 mL	4.65 mL	9.29 mL
10 mM	0.47 mL	2.32 mL	4.65 mL
50 mM	0.09 mL	0.47 mL	0.93 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator

Please refer the product web page under section of “Calculator”

6. Recommended literature which reported protocols for in vitro and in vivo study

In vitro study

1. Akao M, Teshima Y, Marbán E. Antiapoptotic effect of nicorandil mediated by mitochondrial atp-sensitive potassium channels in cultured cardiac myocytes. J Am Coll Cardiol. 2002 Aug 21;40(4):803-10. doi: 10.1016/s0735-1097(02)02007-7. PMID: 12204514.
2. Sato T, Sasaki N, O'Rourke B, Marbán E. Nicorandil, a potent cardioprotective agent, acts by opening mitochondrial ATP-dependent potassium channels. J Am Coll Cardiol. 2000 Feb;35(2):514-8. doi: 10.1016/s0735-1097(99)00552-5. PMID: 10676702.

In vivo study

1. Liu Y, Shu J, Liu T, Xie J, Li T, Li H, Li L. Nicorandil protects against coronary microembolization-induced myocardial injury by suppressing cardiomyocyte pyroptosis via the AMPK/TXNIP/NLRP3 signaling pathway. Eur J Pharmacol. 2022 Dec 5;936:175365. doi: 10.1016/j.ejphar.2022.175365. Epub 2022 Nov 3. PMID: 36336011.

2. Horinaka S, Kobayashi N, Higashi T, Hara K, Hara S, Matsuoka H. Nicorandil enhances cardiac endothelial nitric oxide synthase expression via activation of adenosine triphosphate-sensitive K channel in rat. J Cardiovasc Pharmacol. 2001 Aug;38(2):200-10. doi: 10.1097/00005344-200108000-00005. PMID: 11483869.

7. Bioactivity

Biological target:

Nicorandil-d4 (SG-75-d4) is the deuterium labeled Nicorandil. Nicorandil (SG-75) is a potent potassium channel activator.

In vitro activity

Nicorandil (100 micromol/liter) increased flavoprotein oxidation but not membrane current; a 10-fold higher concentration recruits both mitoK(ATP) and surfaceK(ATP) channels. Nicorandil blunted the rate of cell death in a pelleting model of ischemia; this cardioprotective effect was prevented by the mitoK(ATP) channel blocker 5-hydroxydecanoate but was unaffected by the surfaceK(ATP) channel blocker HMR1098.

Reference: J Am Coll Cardiol. 2000 Feb;35(2):514-8. https://pubmed.ncbi.nlm.nih.gov/10676702/

In vivo activity

This study's aim was to assess whether pharmacologic activation of the K(ATP) channel by nicorandil contributes to endothelial nitric oxide synthase (eNOS) levels. A total of 21 7-week old male Sprague-Dawley rats were used. Nicorandil caused tachycardia without a change in blood pressure, whereas glibenclamide had no effect on the nicorandil-induced change in heart rate or on blood pressure. RT-PCR revealed that nicorandil increased the eNOS and SUR2 mRNA levels by 2.2- and 2.0-fold, respectively, ($p < 0.01$ versus control), and that these increases were completely inhibited by glibenclamide.

Reference: J Cardiovasc Pharmacol. 2001 Aug;38(2):200-10. https://pubmed.ncbi.nlm.nih.gov/11483869/

Note: The information listed here was extracted from literature. MedKoo has not independently retested and confirmed the accuracy of these methods. Customer should use it just for a reference only.